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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
CHANDRA, SATISH				
ART UNIT		PAPER NUMBER		
1792				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

## Application No.

10/521,444

## Applicant(s)

FINK, STEVEN T.

## Examiner

SATISH CHANDRA

## Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 56 - 70 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 56 - 70 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2005 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/5508)
- Paper No(s)/Mail Date 5/07

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 56, 62 – 66 and 68 - 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260).**

**Komino discloses** a processing chamber (Fig 1) comprising:

**Regarding claims 56 and 62 - 66**, a processing vessel (chamber) PC having a lower wall (not labeled) and a side wall (not labeled) having a plurality of pumping ports (not labeled) disposed along the periphery of the floor separated from each other, symmetrically spaced about a chuck assembly 84, and each pumping port connected to a pump cell 88 (Fig 16, Column 14, lines 42 - 64). Komino further discloses if one of the nude type turbo molecular pumps 88 is failed, the reset of the pumps 88 can be operated with a slightly higher evacuation capability so as to compensate for the failed pump. More preferably, the failed pump 88 can be removed from the process module 80 while the process module is in operation so as to replace the failed pump. In such a case, the process module 80 may further comprise valve (seal) 89 (Fig 17) which open and close passages between the respective pumps 88 and the process chamber PC.

When the control unit 95 detects a failed pump 88 via one of the sensors 96, the control unit 95 closes one of the valves 89 corresponding to the failed pump 88 so as to close the passage between the failed pump 88 and the process chamber PC. Accordingly, the negative pressure environment can be maintained when the failed pump 88 is removed from the housing 82 of the process module 80 (Column 17, lines 9 – 34).

**Regarding claim 68**, an upper electrode 93a (Fig 17) to facilitate the formation of plasma.

**Komino does not disclose:**

**Regarding claim 56**, at least one pumping cell, integrally including a pump and a valve, coupled to a first pumping port.

**Kawasaki et al disclose:**

**Regarding claim 56**, a vacuum exhaust system wherein a valve-drive mechanism 64 is provided integrally with the pump body. This valve device is capable of opening regulation, and this single valve device can concurrently function as an opening/closing valve and an opening regulating valve.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the pumping cell of Komino et al with the integrated pump and valve assembly of Kawasaki et al in the apparatus of Komino et al.

The motivation for replacing the pumping cell of Komino et al with the integrated pump and valve assembly of Kawasaki et al is to provide a pump and valve assembly

so the exhaust system around the chamber can be constituted compactly as taught by Kawasaki et al.

**Komino et al and Kawasaki et al do not disclose:**

**Regarding claim 70**, removing the seal from the second pumping port includes removing the seal such that the seal does not contact the lower wall, the upper wall, or the side wall

**Doan et al disclose:**

**Regarding claim 70**, pressure control valving or other apparatus could be associated with one or more of the illustrated pumps, outlets and/or conduits for controlling the pressure or isolating one or more pumps from the chamber while one or more other pump(s) operate(s) relative to the chamber (Column 3, lines 64 – 67).

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide valving or seals so that when removed, do not touch the lower wall, the upper and side wall in the apparatus of Komino et al and Kawasaki et al.

The motivation for providing provide valving or seals so that when removed, do not touch the lower wall, the upper and side wall in the apparatus of Komino et al and Kawasaki et al is the alternative and equivalent way of removing valves or seals without touching the apparatus in the apparatus of Komino et al and Kawasaki et al.

**Komino et al, Kawasaki et al and Doan et al do not disclose:**

**Regarding claim 56**, when the seal is removed from the second pumping port and a substitute pumping cell is provided to the second pumping port such that a gas flow through the vacuum processing apparatus is reconfigured by providing the substitute seal to the first pumping port and providing the substitute pumping cell to the second pumping port.

**Makino et al disclose:**

**Regarding claim 56**, in the first to third preferred embodiments (Column 5, lines 56 – 67), the exhaust pump 18 is provided (Fig 6) on one side-wall of the vacuum processing chamber. This location of the exhaust pump will cause a deviation of gas flow upon evacuation of the chamber. To cope with this deviation, a pair of exhaust pumps (Fig 7) 42 may be provided on the opposite lower side walls of a vacuum processing chamber 41, so as to eliminate the deviation of gas flow upon evacuation (Column 6, lines 1- 6) of the chamber 41.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reconfigure the gas flow when a seal is provided to the first pumping port and a pumping cell is provided to the second pumping port in the apparatus of Komino et al, Kawasaki et al and Doan et al as taught by Makino et al.

The motivation for reconfiguring the gas flow when a seal is provided to the first pumping port and a pumping cell is provided to the second pumping port in the apparatus of Komino et al, Kawasaki et al and Doan et al is to provide a different gas flow direction to optimize the apparatus of Komino et al, Kawasaki et al and Doan et al.

**Claims 57 – 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed in claims 56, 62 – 66 and 68 - 70 above and further in view of Dandl et al (US 2001/0016166) and Os et al (US 6,178,918).**

**Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:**

**Regarding claim 57**, the side-wall has a height of at most about four inches.

**Regarding claim 58 and 59**, process chamber is made of a plate stock of aluminum having a thickness of about four inches.

**Dandl et al discloses:**

**Regarding claim 57**, the vertical height of the space between a substrate and a partition wall 4 is of the order of 10.2 cm (about 4 inches, Para 0124, Fig 1).

**Os et al disclose:**

**Regarding claim 58 and 59**, a cylindrical process chamber made of aluminum.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the vertical height of the side wall about four inches; make the process chamber from stock of aluminum in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Dandl et al and Os et al respectively.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the process chamber from plate stock of aluminum of four inches thick in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

The motivation to provide a side wall with a height of about four inches is to optimize the size of the process chamber in order to minimize fabrication and other costs in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

The motivation for making the process chamber from a single stock of aluminum plate is again to minimize fabrication costs in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al.

The motivation for making the process chamber from plate stock of aluminum of four inch thick in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al is to optimize the thickness of the processing chamber.

**Claim 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed in claims 56, 62 – 66 and 68 - 70 above and further in view of Carducci et al (US 2003/0038111).**

**Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:** the process chamber is configured to have a chamber liner configured to reduce the open volume within the process chamber.

**Carducci et al discloses:**

**Regarding claim 67,** chamber liner 104 is disposed as a first liner 134, a second liner 118 and the lid liner 104 (Para 0056) adjacent to walls 106, 108 and the lid 102.



Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to install a liner in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Carducci et al respectively.

The motivation to provide a liner in the process chamber is to prevent the plasma gases from attacking the process chamber walls in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Carducci et al.

**Claims 60 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino (US 6,634,845) in view of Kawasaki et al (US 6,382,249), Doan et al (US 7,030,037) and Makino et al (US 5,391,260) as discussed above in claims 56, 62 – 66 and 68 - 70 and further in view of Ishii (US 5,685,942).**

**Komino, Kawasaki et al, Doan et al and Makino et al do not disclose:**

**Regarding claim 60**, the step of making the process chamber comprises a molding process.

**Regarding claim 61**, the lower wall is a plate and the side-wall is a rolled cylinder which is welded into the plate.

**Ishii discloses:**

**Regarding claim 60**, a plasma etching equipment 1 (Fig1) includes a processing housing 2 molded into a circular cylinder or a rectangular cylinder out of conducting material such as aluminum (Column 3, lines 30 – 35).

**Regarding claim 61**, it is well known in the art that two pieces can be joined together by welding.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a molding process for fabricating a process chamber in the apparatus of Komino, Kawasaki et al, Doan et al and Makino et al as taught by Ishii.

The motivation for using a molding process for fabricating a process chamber is to provide an alternate and equivalent means of fabricating process chambers as taught by Ishii.

### ***Response to Arguments***

Applicant's arguments filed 1/30/2008 have been fully considered but they are not persuasive.

Regarding the arguments:

Claim 56 recites, in part, "removing the pumping cell from the first pumping port and providing a substitute seal to the first pumping port such that the substitute seal blocks a gas flow through the first pumping port; and removing the seal from the second pumping port and providing a substitute pumping cell to the second pumping port such that a gas flow through the vacuum processing apparatus is reconfigured by the providing the substitute seal to the first pumping port and the providing the substitute pumping cell to the second pumping port."

Applicant notes that the substitute seal provided to the first pumping port may be the same seal that is removed from the second pumping port, or a different seal. Additionally, the substitute pumping cell provided to the second pumping port may be the same pumping cell removed from the first pumping port or a different pumping port. Thus, the method of making an improved vacuum processing apparatus recited in Claim 56 is aimed at pumping cells and seals that can be reconfigured within the various pumping ports such that the gas flow is also reconfigured.

The Office Action, on page 3, concedes that the combination of Komino and Kawasaki does not disclose or suggest removing the pumping cell from the first pumping port and providing a substitute seal to the first pumping port, the substitute seal being configured to block a gas flow through the pumping port. Instead, the Office Action relies on Doan to cure these deficiencies of Komino and Kawasaki. Specifically, the Office Action relies on the pressure control valving and the isolating valve 42 described in Doan. Regarding the pressure control valving and the isolating valve 42,

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Doan describes that these valves are to isolate one of the pumps 26, 28 from the chamber 12 during operation.

However, it is respectfully submitted that Doan does not disclose or suggest "removing the pumping cell from the first pumping port and providing a substitute seal to the first pumping port such that the substitute seal blocks a gas flow through the first pumping port," as recited in Claim 56.

Instead, Doan merely describes that one of the pumps 26, 28 can be isolated from the chamber 12 by the valves. Doan does not describe that one of the pumps 26, 28 is removed from a pumping port after the pump 26, 28 is isolated. Additionally, Doan does not disclose or suggest that these valves would effectively seal the port where the pump 26, 28 was located when the pump 26, 28 is removed from the port. Thus, it is respectfully submitted that the valves described in Doan are not the claimed seals.

**The Examiner disagrees because of the following reason:**

Komino discloses if one of the nude type turbo molecular pumps 88 is failed, the reset of the pumps 88 can be operated with a slightly higher evacuation capability so as to compensate for the failed pump. More preferably, **the failed pump 88 can be removed from the process module 80** while the process module is in operation so as to replace the failed pump. In such a case, the process module 80 may further comprise valve 89 (Fig 17) which open and close passages between the respective pumps 88 and the process chamber PC. When the control unit 95 detects a failed pump 88 via one of the sensors 96, **the control unit 95 closes one of the valves 89 corresponding to the failed pump 88 so as to close the passage between the failed pump 88 and the process chamber PC.** Accordingly, the negative pressure environment can be maintained when the failed pump 88 is removed from the housing 82 of the process module 80 (Column 17, lines 9 – 34).

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Further all the valves used in the above references are the claimed seal. A valve is a seal since it tightly or completely closes a thing (in this case a port on which the pumping cell is mounted).

Regarding the arguments:

The Office Action, on page 4, concedes that the combination of Komino, Kawasaki, and Doan does not disclose or suggest removing the seal from the second pumping port and providing a substitute pumping cell to the second pumping port such that a gas flow through the apparatus is reconfigured. Instead, the Office Action relies on Makino to cure these deficiencies of Komino, Kawasaki, and Doan.

Specifically, the Office Action relies on the modified embodiment described at lines 1-6, on column 6 of Makino. Makino describes a modification of an embodiment of a vacuum apparatus in which a pair of exhaust pumps 42 are provided on lower side walls of the apparatus.2

However, it is respectfully submitted that Makino does not disclose or suggest "removing the seal from the second pumping port and providing a substitute pumping cell to the second pumping port such that a gas flow through the vacuum processing apparatus is reconfigured by the providing the substitute seal to the first pumping port and the providing the substitute pumping cell to the second pumping port," as recited in Claim 56.

Instead, it is respectfully submitted that the modification described in Makino is not a reconfiguration of a vacuum processing apparatus. Instead, the pair of exhaust pumps 42 were not added to a pumping port that previously was sealed. Further, Makino does not disclose or suggest that the apparatus can be reconfigured such that a seal is provided in place of one of the pair of exhaust pumps 42. Thus, Makino does not describe a reconfigurable apparatus, but instead describes a number of different apparatuses that each have a different configuration.

Therefore, it is respectfully submitted that the combination of Komino, Kawasaki, Doan, and Makino does not disclose or suggest every feature recited in Claim 56. Specifically, even assuming the cited combination is proper, the combination does not disclose or suggest the reconfiguration of pumping cells within a vacuum processing apparatus by using seals to effectively block a pumping port when the pumping cell is removed therefrom. Thus, it is respectfully requested that the outstanding rejection of Claim 56, and all claims dependent thereon, as unpatentable over Komino in view of Kawasaki, Doan, and Makino, be withdrawn.

The Examiner disagrees because of the following reasons:

Regarding the Makino reference, Makino discloses providing an exhaust pump 18 (Fig 6) on one side-wall of the vacuum processing chamber. This location of the exhaust pump **will cause a deviation of gas flow** (in the direction of the exhaust pump) upon evacuation of the chamber. **To cope with this deviation, a pair of exhaust pumps (Fig 7) 42 may be provided** on the opposite lower side walls of a vacuum processing chamber 41, **so as to eliminate the deviation of gas flow upon evacuation** (Column 6, lines 1- 6) of the chamber 41. Therefore it would have been obvious to a skilled artisan that the gas flow is affected by the positioning of a vacuum pump. It would also have been obvious to a skilled artisan that the gas flow through the processing apparatus is reconfigured in the direction of the pumping cell (s) by the providing of the substitute seal to the first pumping port and providing the substitute pumping cell to the second pumping port.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish Chandra whose telephone number is 571-272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Jeffrie R. Lund can be reached on 571-272-1437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrie R. Lund/  
Primary Examiner, Art Unit 1792

Satish Chandra

Jeffrie R. Lund  
Primary Examiner

SC  
2/13/2008